



**Bison Oil Well Cementing  
Tail & Lead**

Date: 11/8/2017

Invoice # 666243

API# 05-123-45370

Supervisor: Nick Vigil

Customer: Noble Energy Inc.

Well Name: Bison Ridge Y22-756

County: Weld

State: Colorado

Sec: 10

Twp: 2N

Range: 64W

Consultant: Woodie

Rig Name & Number: H&P 517

Distance To Location: 38 miles

Units On Location: 4023/4030/4031

Time Requested: 5:30

Time Arrived On Location: 5:25

Time Left Location:

WELL DATA	Cement Data
<p>Casing Size (in) : 9.625</p> <p>Casing Weight (lb) : 36</p> <p>Casing Depth (ft.) : 2,055</p> <p>Total Depth (ft) : 2065</p> <p>Open Hole Diameter (in) : 13.50</p> <p>Conductor Length (ft) : 80</p> <p>Conductor ID : 15.25</p> <p>Shoe Joint Length (ft) : 44</p> <p>Landing Joint (ft) :</p> <p>Sacks of Tail Requested 100</p> <p>HOC Tail (ft): 0</p> <p>One or the other, cannot have quantity in both</p> <p>Max Rate: 8</p> <p>Max Pressure: 2000</p>	<p><b>Lead</b></p> <p>Cement Name:</p> <p>Cement Density (lb/gal) : 13.5</p> <p>Cement Yield (cuft) : 1.7</p> <p>Gallons Per Sack 9.00</p> <p>% Excess 15%</p> <p><b>Tail</b></p> <p>Cement Name:</p> <p>Cement Density (lb/gal) : 15.2</p> <p>Cement Yield (cuft) : 1.27</p> <p>Gallons Per Sack: 5.89</p> <p>% Excess: 0%</p> <p>Fluid Ahead (bbls) 30.0</p> <p>H2O Wash Up (bbls) 20.0</p> <p>Spacer Ahead Makeup</p> <p>Dye in second 10 bbl</p>

Casing ID 8.921 Casing Grade J-55 only used

Lead Calculated Results	Tail Calculated Results
<b>HOC of Lead 1750.22 ft</b> Casing Depth - HOC Tail	<b>Tail Cement Volume In Ann 127.00 cuft</b> (HOC Tail) X (OH Ann)
<b>Volume of Lead Cement 855.38 cuft</b> HOC of Lead X Open Hole Ann	<b>Total Volume of Tail Cement 107.90 Cuft</b> (HOC Tail X OH Ann) - (Shoe Length X Shoe Joint Ann)
<b>Volume of Conductor 61.05 cuft</b> (Conductor ID Squared) - (Casing Size OD Squared) X (.005454) X (Conductor Length ft)	<b>bbls of Tail Cement 22.62 bbls</b> (HOC of Tail) X (OH Ann) + (Cement Yield) X (Shoe Joint Ann) X (.1781) X (% Excess)
<b>Total Volume of Lead Cement 916.43 cuft</b> (cuft of Lead Cement) + (Cuft of Conductor)	<b>HOC Tail 220.78 ft</b> (Tail Cement Volume) ÷ (OH Ann)
<b>bbls of Lead Cement 187.70 bbls</b> (Total cuft of Lead Cement) X (.1781) X (1+%Lead Excess)	<b>Sacks of Tail Cement 100.00 sk</b> (Total Volume of Tail Cement) ÷ (Cement Yield)
<b>Sacks of Lead Cement 619.94 sk</b> (Total Slurry Volume) ÷ (Cement Yield) X (% Excess Cement)	<b>bbls of Tail Mix Water 14.02 bbls</b> (Sacks of Tail Cement X Gallons Per Sack) ÷ 42
<b>bbls of Lead Mix Water 132.84 bbls</b> (Sacks Needed) X (Gallons Per Sack) ÷ 42	Pressure of cement in annulus
<b>Displacement 155.76 bbls</b> (Casing ID Squared) X (.0009714) X (Casing Depth) + (Landing Joint) - (Shoe Length)	<b>Hydrostatic Pressure 585.23 PSI</b>
<b>Total Water Needed: 352.63 bbls</b>	<b>Collapse PSI: 2020.00 psi</b> <b>Burst PSI: 3520.00 psi</b>

X Authorization To Proceed

